

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

MINERAL INVESTIGATION OF THE GUADALUPE ESCARPMENT WILDERNESS STUDY AREA,
EDDY COUNTY, NEW MEXICO

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This open file report summarizes the results of a Bureau of Mines wilderness study and will be incorporated in a joint report with the Geological Survey. The report is preliminary and has not been edited or reviewed for conformity with the Bureau of Mines editorial standards. Work on this study was conducted by personnel from Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, CO 80225.

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the Geological Survey and the Bureau of Mines to survey certain areas on Federal lands to determine their mineral potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral investigation of the Guadalupe Escarpment Wilderness Study Area in the Lincoln National Forest, Eddy County, New Mexico. Guadalupe Escarpment was established as a wilderness study area by Public Law 96-550, December 19, 1980.

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MINERAL INVESTIGATION OF THE GUADALUPE ESCARPMENT
WILDERNESS STUDY AREA, EDDY COUNTY, NEW MEXICO

By John R. Thompson, Bureau of Mines

INTRODUCTION

The Bureau of Mines conducted a mineral survey of the Guadalupe Escarpment Wilderness Study Area, Eddy County, New Mexico, in the fall of 1981, to be used in conjunction with studies by the Geological Survey.

Prior to the field investigation, a detailed search was made for pertinent geologic and mining information. Eddy County Courthouse records were examined for mining claim locations. Records of the Bureau of Land Management (BLM) were checked for patented and unpatented claims, and oil and gas leases.

Field investigations by Bureau of Mines personnel included an investigation of mines, prospects, and mineralized areas. Surface and underground workings within 2 mi of the study area were mapped and sampled; 24 samples were collected. All samples were fire assayed for gold and silver, and checked by spectrographic analysis. Complete analytical results of all samples are available for public inspection at the Bureau of Mines, Intermountain Field Operations Center, Denver Federal Center, Denver, CO 80225.

Location, size, and geographic setting

Guadalupe Escarpment Wilderness Study Area is located in southeastern New Mexico in southern Eddy County, 25 mi southwest of Carlsbad and 17 mi west of Whites City. The study area is about 12 mi long and 3 mi wide. It comprises approximately 21,300 acres of the Lincoln National Forest. Carlsbad Caverns National Park borders the study area on the east and Guadalupe Mountains National Park, Texas, forms the southern boundary (fig. 1).

Contained in the study area is North McKittrick Canyon, Big Canyon, and Black Canyon. Big Canyon is incised over 2,000 ft into the Guadalupe Ridge.

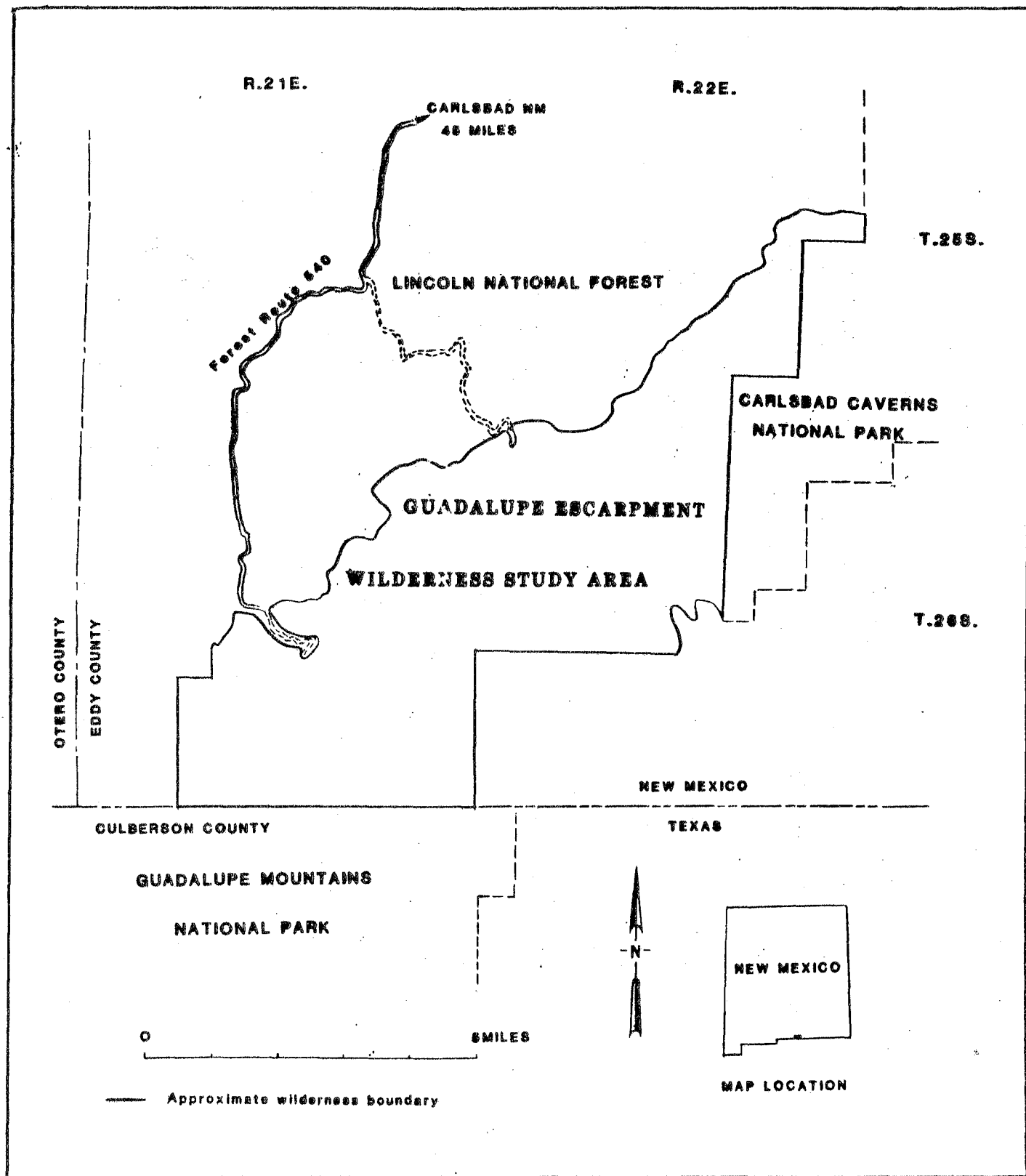


Figure 1.--Index map showing location of the Guadalupe Escarpment Wilderness Study Area, Eddy County, New Mexico

Elevations range from 7,480 ft on the north rim of North McKittrick Canyon, to 4,880 ft at the southeast corner of the area. Access is by State Highway 137 from the north. Forest Service roads and jeep trails provide reasonable access to the northern perimeter of the area, but the interior portions are accessible only on foot or by horseback.

Mining activity

The Guadalupe Escarpment Wilderness Study Area has been superficially prospected since the early 1900's. No patented claims and fewer than 10 unpatented claims have been staked in the study area. Two claims in the study area were on record with the BLM in October 1982. Most of the lode claims adjacent to the study area were located for copper, while older claims were probably staked for bat guano. In 1981, no mines or prospects were being worked within or adjacent to the study area.

As of November 1981, oil and gas leases had been granted within 2 mi of the study area, and twelve oil and gas lease applications were on file with the BLM (fig. 7). There is one oil and gas test well in the vicinity of the study area. This wildcat well was collared in October 1968, and reached a depth of 8,000 ft before being abandoned in January 1969.

MINING DISTRICTS AND MINERALIZED AREAS

No recognized mining districts are in the Guadalupe Escarpment Wilderness Study Area. Several mines and prospects were found in three weakly mineralized areas: two in the study area and one, a more heavily mineralized zone, south of the study area. The mines outside the study area, in the Texas Calumet mining area (inside what is now the Guadalupe Mountains National Park, Texas), were examined in detail because similar rocks occur within the study area. The only recorded production was from the Texas Calumet Mines.

The two mineralized zones in the study area are close to the western boundary. The northern mineralized zone (fig. 2) is bounded on the north by the northeast-trending Guadalupe Ridge anticline and on the south by the northeast-trending Walnut Canyon syncline (Hayes, 1964, p. 40). Associated with these structures are perpendicular tension joints that formed channels along which ground water could pass; many caves in the vicinity have been formed by this process. The joints and minor faults in this area were probably passageways for weak mineralizing fluids.

The northern mineralized zone was explored by four prospect pits dug into the Permian Seven Rivers Formation where a thin bed of highly iron-stained sandstone crops out. A shaft, known as the Queen of the Guadalupe Mine, (fig. 3A & B) is in sandstone of the Seven Rivers Formation and intersects a vertical limestone cave. At the shaft, some azurite, malachite, bornite, and abundant hematite were identified. North of the mineralized zone a prospect adit in Fir Canyon was driven into the base of the Permian Seven Rivers Formation where pisolitic dolomite, exhibiting slight iron oxide staining, is exposed.

Analysis of three chip samples and three random dump samples at the northern mineralized zone showed no gold or silver and low values of copper and other metallic minerals (table 1).

The southern mineralized zone (Devils Den prospect), about 5 mi southwest of the northern area (fig. 2 and 4A, B, C), is also bounded by the Guadalupe Ridge anticline and the Walnut Canyon syncline. The Devils Den prospect lies close to a north-trending frontal fault that forms the Shattuck Valley scarp. The frontal fault can be traced into Dog Canyon, Texas, and is very near the Texas Calumet area 2 mi south of the study area. The fault does not enter the study area, but bounds the area on the west.

The southern mineralized zone has been explored by a prospect and adit on the Broken Horseshoe claim. The adit was driven 48 ft into dolomite of the Seven Rivers Formation (fig. 4C) where some azurite and malachite staining and small amounts of earthy and specular hematite are exposed. East of the mineralized zone a 21-ft-deep shaft was dug on a vertical fault trending N. 19° E. in iron-stained sandstone of the Yates Formation (fig. 4A & B). Analysis of three chip samples from the prospect, adit, and shaft, and one sample from the dump showed no gold or silver and low values of copper and other metallic minerals (table 1). The weak mineralization may be related to ground water solutions passing along the frontal fault.

The third mineralized zone, the more heavily mineralized zone at the Texas Calumet workings, 2 mi south of the southwest corner of the study area, is on a graben created by the major Dog Canyon fault (King, 1948, p. 110). The mineralized zone contains four adits driven into dolomite of the Seven Rivers Formation. The dolomite contains epigenetic deposits of copper and iron along thin joints and fault zones. Northwest-trending vertical faults contain hematite, azurite, and malachite (fig. 5, 6A, 6B). The thin mineralized faults of the Texas Calumet Mines were probably spurs of the major Dog Canyon fault. The mineralizing fluids along the Dog Canyon fault probably were more metal-rich than solutions along joints or other faults in the area. Projections of these faults would not enter the study area.

Records show that in 1914 and 1926-27 approximately 66 tons of ore, containing 5,256 lbs of copper and 3 oz of silver, were mined from the Texas Calumet Mines (Lasky, 1933, p. 46). Thirteen chip samples and one dump sample contained no gold or silver, but copper, lead, and zinc were present (table 1).

Energy resources

The Capitan and Goatseep reefs, reservoir rocks to the east of the study area, occur in the south and east sections of the study area, but these formations are exposed at the surface and this lessens the favorability for the accumulation of petroleum fluids. Oil and gas may be discovered at greater depths in the thousands of feet of buried sedimentary rock that could contain stratigraphic or structural traps. An oil and gas test well just outside the study area, and adjacent to the southern mineralized area, was collared in Yates Formation dolomite and reached a depth of 8,000 ft before being abandoned in Pennsylvanian rocks. No shows of oil or gas were reported.

CONCLUSIONS

Prospect pits and workings in and adjacent to the study area expose small amounts of mineralized rock. All prospects are in proximity to, or have structures related to the north-trending fault on the western edge of the study area, and the weak mineralization present may be related to this fault. Lack of significant replacement in the carbonate rocks suggests that mineralizing fluids were not metal-rich, and richer occurrences should not be presumed at depth along the frontal fault. No evidence was found at the prospects to indicate the presence of resources.

No oil and gas test wells have been drilled inside the study area; however, one dry hole was drilled just outside the southwest boundary. No energy-resources were identified.

REFERENCES

- Hayes, P. T., 1964, Geology of the Guadalupe Mountains, New Mexico: U.S. Geological Survey Professional Paper 446, 69 p.
- King, P. B., 1948, Geology of the southern Guadalupe Mountains, Texas: U.S. Geological Survey Professional Paper 215, 183 p.
- Lasky, S. G., and Wootton, T. P., 1933, The metal resources of New Mexico and their economic features: New Mexico School of Mines Bulletin No. 7, 178 p.

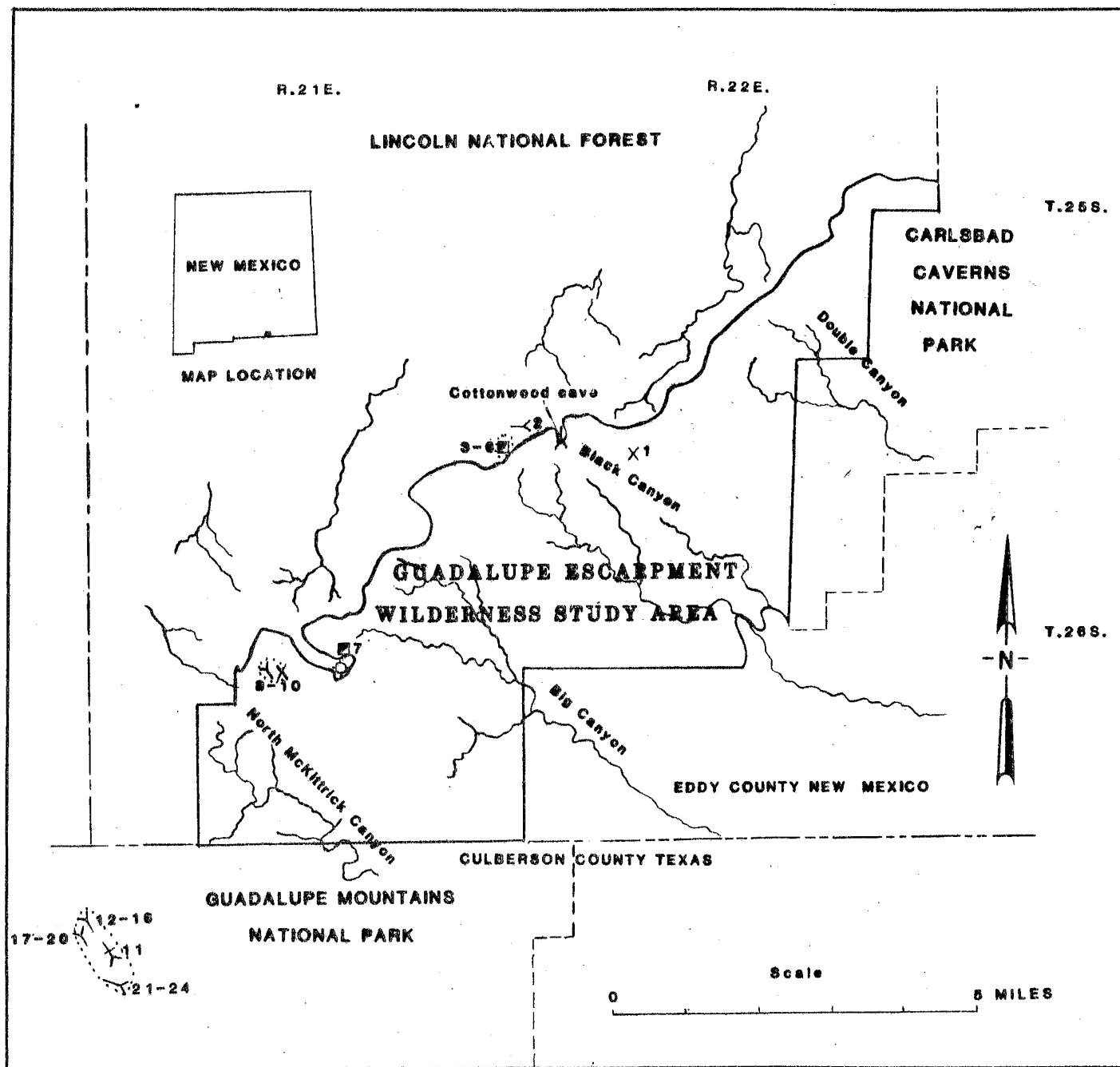
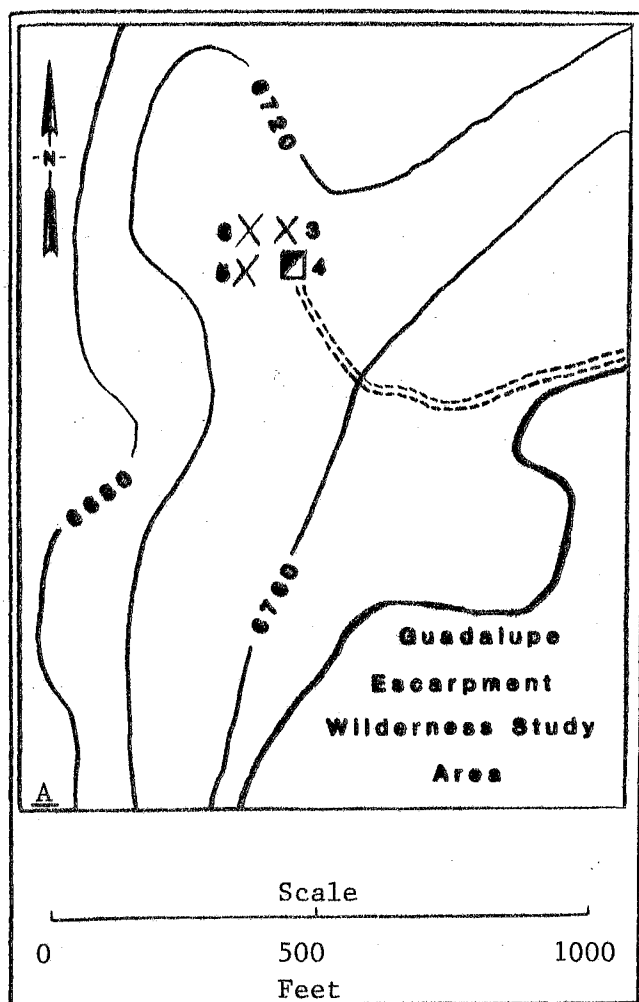


Figure 2.--Mine and prospect map of the Guadalupe Escarpment Wilderness Study Area, Eddy County, New Mexico.



EXPLANATION

- ✕ Prospect pit
- ▣ Shaft
- Approximate wilderness boundary

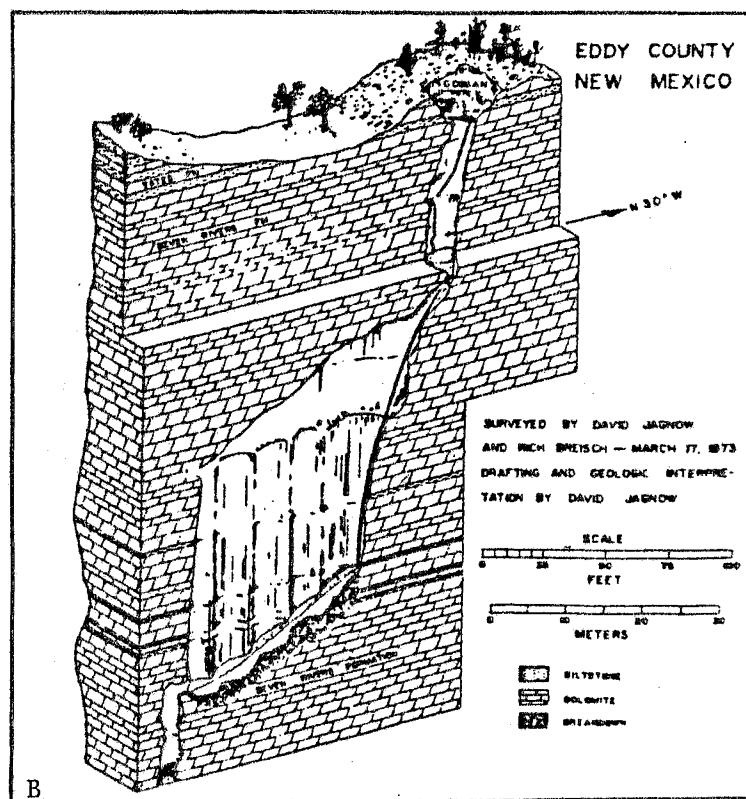
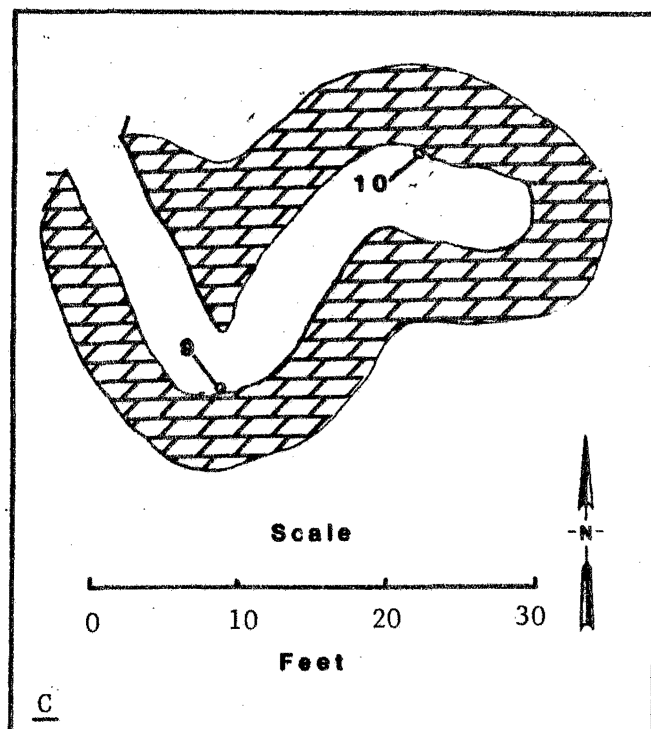
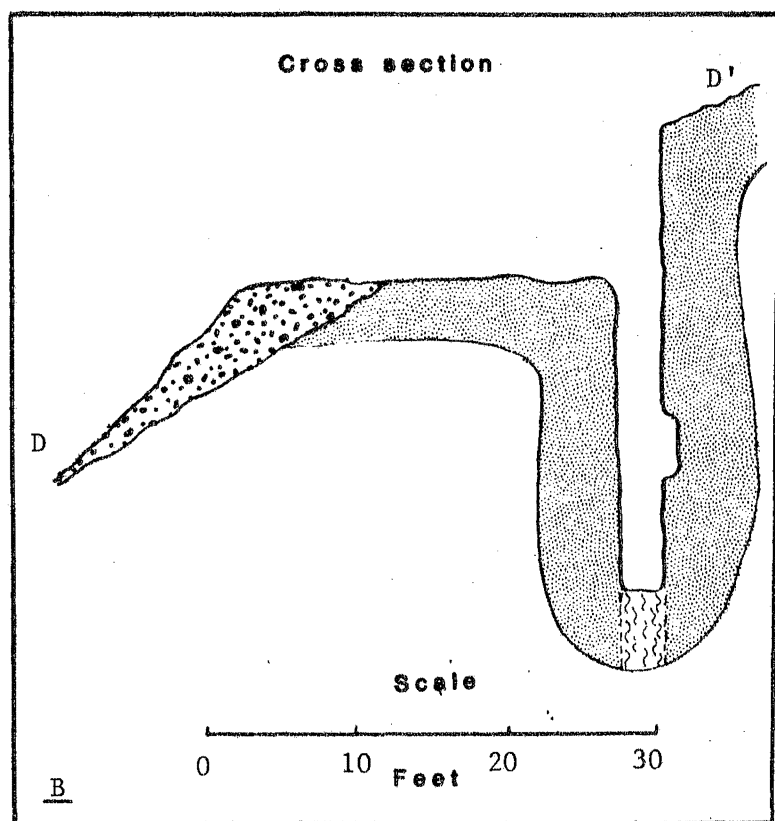
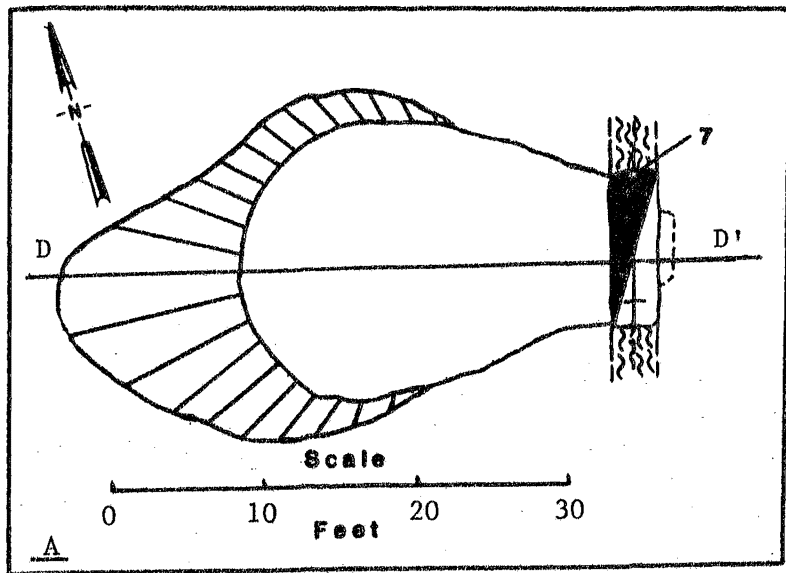


Diagram of cave under the shaft at the Queen of the Guadalupe claim. Courtesy of the U.S. Forest Service.

Figure 3A.--Map showing workings at the Queen of the Guadalupe mine and sample localities 3-6.

Figure 3B.--Cross section of cave at the Queen of the Guadalupe mine.



- EXPLANATION**
- Dolomite
 - Sandstone
 - Fault gouge
 - Vertical fault
 - Shaft
 - Dump
- 12 Sample locality and number

Figure 4A.--Shaft at the Mc-Th-Pi prospect and sample locality 7.
 Figure 4B.--Cross section of the shaft at the Mc-Th-Pi prospect.
 Figure 4C.--Adit on the Broken Horseshoe claim (Devils Den prospect)
 and sample localities 9-10.

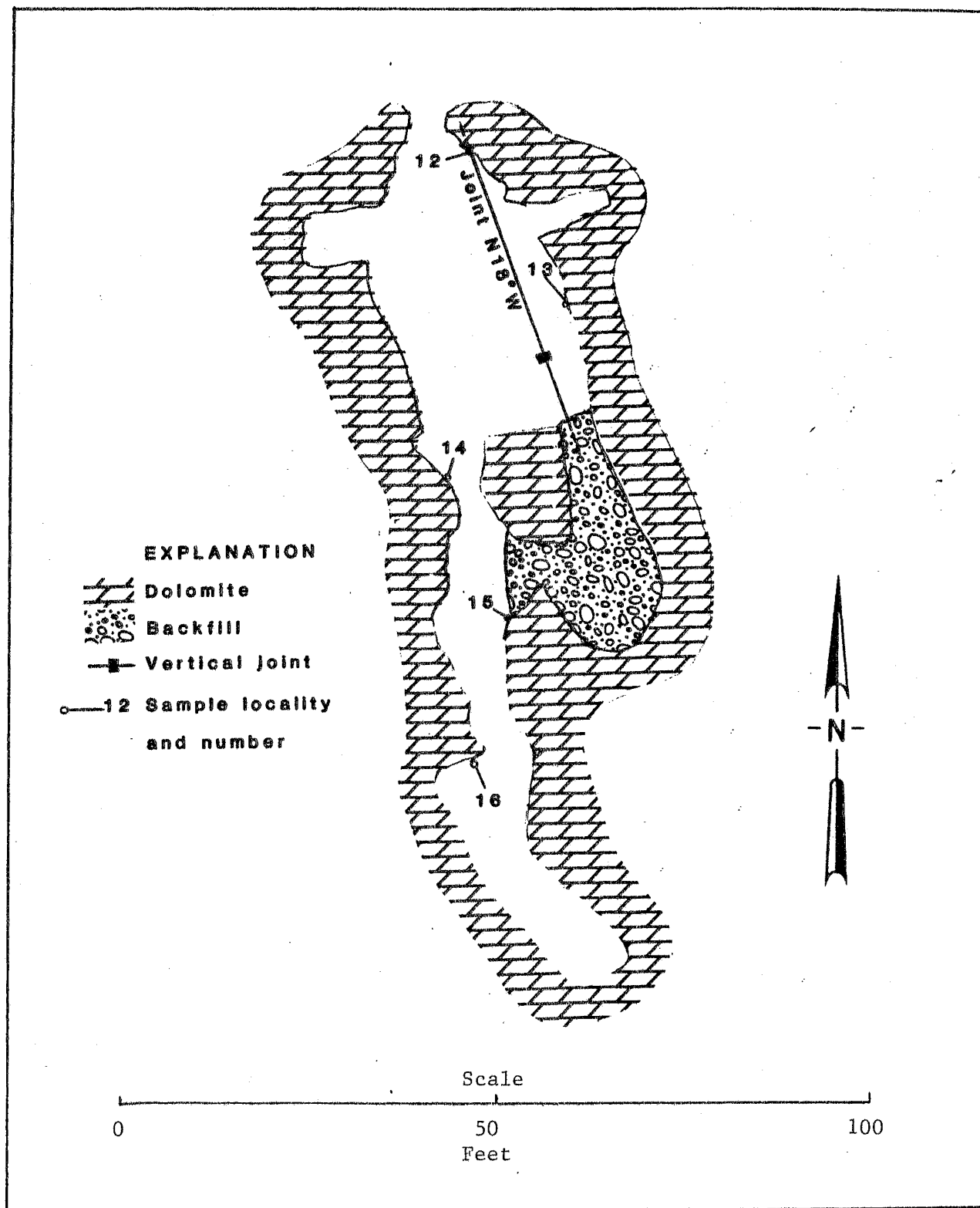


Figure 5.--Adit in the Texas Calumet mining area and sample localities 12-16.

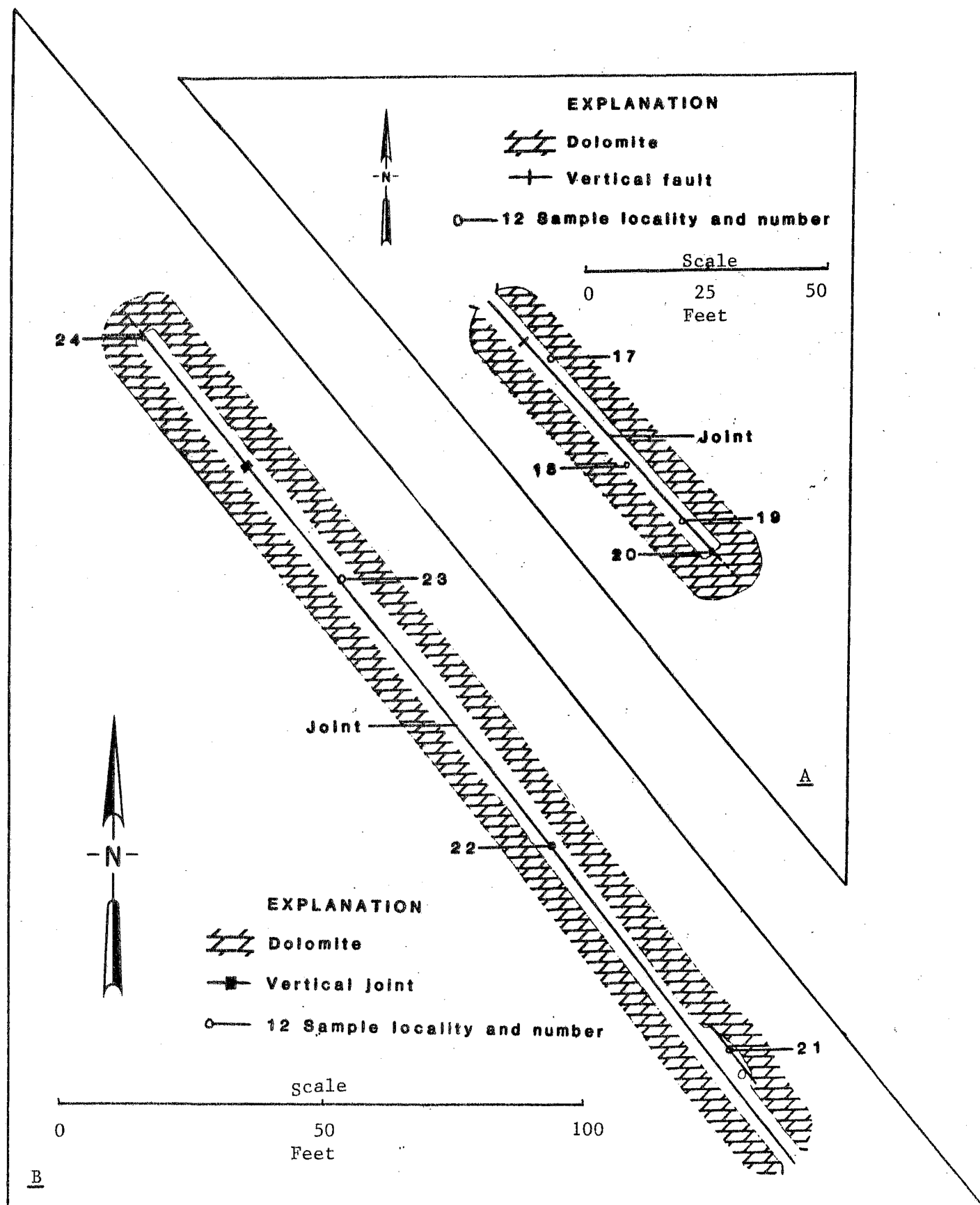


Figure 6A.--Adit in the Texas Calumet mining area and sample localities 17-20.
 Figure 6B.--Adit in the Texas Calumet mining area and sample localities 21-24.

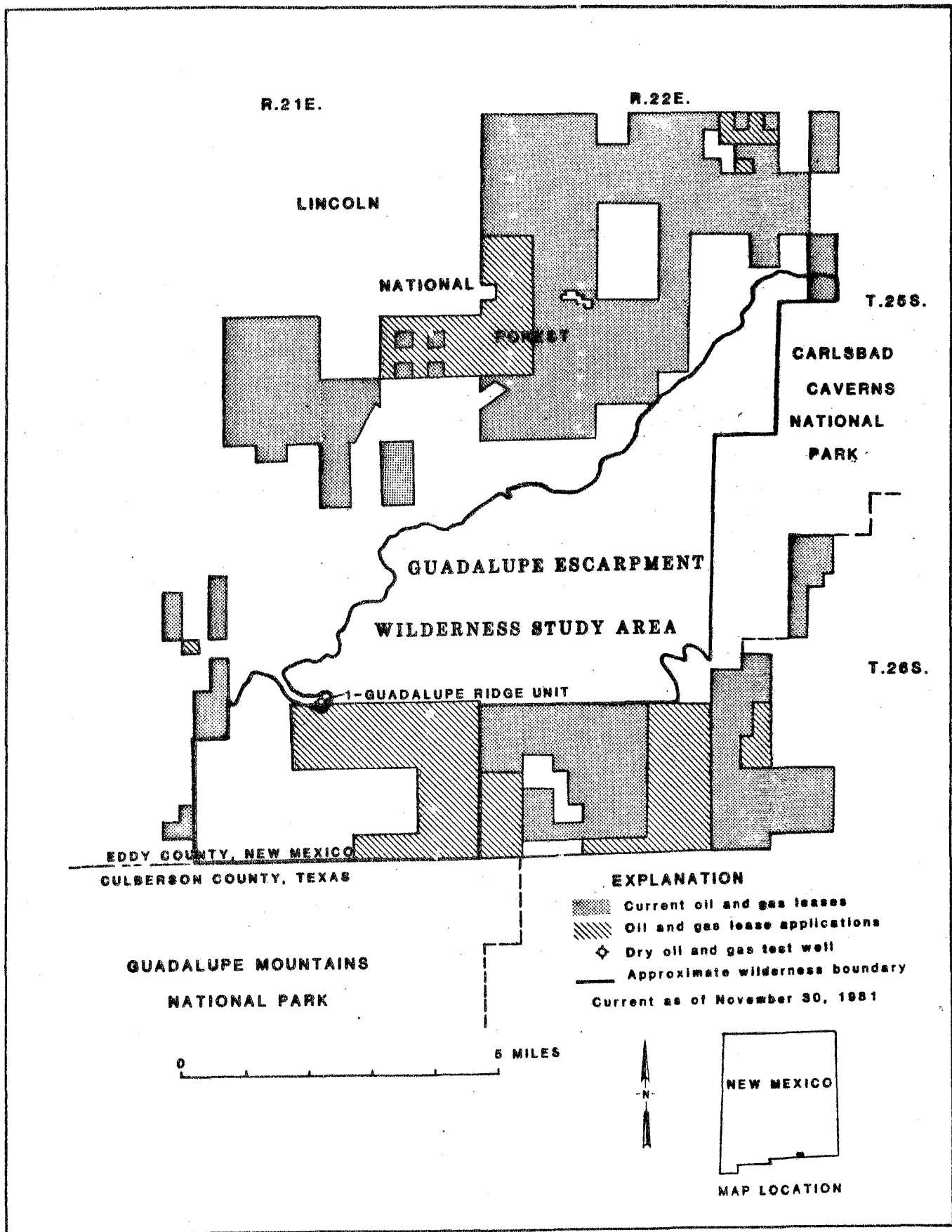


Figure 7.--Oil and gas leases and lease applications in and around the Guadalupe Escarpment Wilderness Study Area, Eddy County, New Mexico.

Table 1.--Fire assay and selected spectrographic and chemical analysis of samples
from the Guadalupe Escarpment Wilderness Study Area, Eddy County, New Mexico

[---, tested for but not found above detection limit; *, chemical analysis; >, greater than]

				Analytical data					
		Sample		Au	Ag	Cu	Mo	Pb	Zn
No.	type	width	Description	oz/ton				percent	
GUADALUPE RIDGE PROSPECT									
1	Grab		Pit dump, iron-stained sandstone and limestone.	---	---	0.001	---	---	---
FIR CANYON PROSPECT									
2	Chip	4 ft	Short adit, limestone with calcite and iron staining.	---	---	.02	---	0.04	---
QUEEN OF THE GUADALUPE CLAIM									
3	Chip	5 ft	Trench, sandstone with abundant iron staining.	---	---	.004	.02	.05	0.1
4	Grab		Shaft dump, sandstone with abundant iron staining.	---	---	.005	.003	---	---
5	Grab		Pit dump, iron-stained sandstone with rare azurite, malachite, and bornite.	---	---	.01*	.002	---	.1
6	Chip	4 ft	Trench, sandstone and limestone breccia with iron staining.	0.006	---	.004	.001	.02	---
MC-TH-PI PROSPECT									
7	Chip	3 ft	Shaft, N. 19° E. vertical fault in sandstone with gouge material.	---	---	.02	.002	.4	.1